

1. A communication system to transfer user communications for a user, the communication system comprising:

an optical network configured to transfer first user communications over a first optical wavelength and over a second optical wavelength;

5 a first Point-of-Presence (POP) configured to receive the first user communications from a first user system, transfer the first user communications to the optical network over the first optical wavelength, and responsive to a problem with the transfer of the first user communications over the first optical wavelength, to transfer the first user communications to the optical network over the second optical wavelength  
10 instead of the first optical wavelength; and

a second POP configured to receive the first user communications from the optical network over the first optical wavelength and transfer the first user communications to a second user system, and responsive to the problem with the transfer of the first user communications over the first optical wavelength, to receive the first user  
15 communications from the optical network over the second optical wavelength instead of the first optical wavelength and transfer the first user communications to the second user system.

2. The communication system of claim 1 wherein the first POP is configured to receive  
20 the first user communications from the first user system over the first optical wavelength.

3. The communication system of claim 1 wherein the second POP is configured to transfer the first user communications to the second user system over the first optical wavelength.

4. The communication system of claim 1 wherein the first POP is configured to detect the problem with the transfer of the first user communications over the first optical wavelength.

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5. The communication system of claim 1 wherein:

the second POP is configured to detect the problem with the transfer of the first user communications over the first optical wavelength and transfer a control instruction to the first POP; and

10 the first POP is configured to receive the control instruction and transfer the first user communications to the optical network over the second optical wavelength responsive to the control instruction.

6. The communication system of claim 1 wherein:

15 the optical network is configured to detect the problem with the transfer of the first user communications over the first optical wavelength and transfer a control instruction to the first POP; and

the first POP is configured to receive the control instruction and transfer the first user communications to the optical network over the second optical wavelength  
20 responsive to the control instruction.

7. The communication system of claim 1 wherein:

the user is configured to detect the problem with the transfer of the first user communications over the first optical wavelength and transfer a control instruction to the first POP; and

5 the first POP is configured to receive the control instruction and transfer the first user communications to the optical network over the second optical wavelength responsive to the control instruction.

8. The communication system of claim 1 wherein:

10 the user is configured to detect the problem with the transfer of the first user communications over the first optical wavelength and transfer a control instruction to the second POP; and

the second POP is configured to receive the control instruction and receive the first user communications from the optical network over the second optical wavelength  
15 responsive to the control instruction.

9. The communication system of claim 1 wherein the optical network is configured to transfer the first user communications over the first optical wavelength in a first physical path and transfer the first user communications over the second optical wavelength in a  
20 second physical path wherein the first physical path is geographically diverse from the second physical path.

10. The communication system of claim 1 wherein:

the optical network is configured to transfer second user communications over a third optical wavelength and over a fourth optical wavelength;

the second POP is configured to receive the second user communications from the second user system, transfer the second user communications to the optical network over the third optical wavelength, and responsive to a problem with the transfer of the second user communications over the third optical wavelength, to transfer the second user communications to the optical network over the fourth optical wavelength instead of the third optical wavelength; and

the first POP is configured to receive the second user communications from the optical network over the third optical wavelength and transfer the second user communications to the first user system, and responsive to the problem with the transfer of the second user communications over the third optical wavelength, to receive the second user communications from the optical network over the fourth optical wavelength instead of the third optical wavelength and transfer the second user communications to the first user system.

11. The communication system of claim 1 wherein the first POP comprises a wavelength switching system configured to receive the first user communications from the first user system and transfer the first user communications over the first optical wavelength or over the second optical wavelength.

12. The communication system of claim 11 wherein the wavelength switching system is configured to detect the problem with the transfer of the first user communications over the first optical wavelength.

5 13. The communication system of claim 11 wherein the first POP comprises a Wavelength Division Multiplexing (WDM) system configured to receive the first user communications from the wavelength switching system over the first optical wavelength and transfer the first user communications over the first optical wavelength or to receive the first user communications from the wavelength switching system over the second  
10 optical wavelength and transfer the first user communications over the second optical wavelength.

14. The communication system of claim 13 wherein:

the WDM system is configured to detect the problem with the transfer of the first  
15 user communications over the first optical wavelength and transfer a control instruction to the wavelength switching system; and

the wavelength switching system is configured to receive the control instruction and transfer the first user communications to the optical network over the second optical wavelength responsive to the control instruction.

15. The communication system of claim 13 wherein the first POP comprises a Synchronous Optical Network (SONET) Add/Drop Multiplexer (ADM) system configured to receive the first user communications from the WDM system over the first optical wavelength and transfer the first user communications to the optical network over the first optical wavelength or to receive the first user communications from the WDM system over the second optical wavelength and transfer the first user communications to the optical network over the second optical wavelength.

16. The communication system of claim 15 wherein:

the SONET ADM system is configured to detect the problem with the transfer of the first user communications over the first optical wavelength and transfer a control instruction to the wavelength switching system; and

the wavelength switching system is configured to receive the control instruction and transfer the first user communications to the optical network over the second optical wavelength responsive to the control instruction.

17. A method of operating a communication system to transfer user communications for a user, the method comprising:

in a first Point-of-Presence (POP), receiving first user communications from a first user system and transferring the first user communications to an optical network over a first optical wavelength;

in the optical network, receiving the first user communications from the first POP over the first optical wavelength and transferring the first user communications to a second POP over the first optical wavelength;

in the second POP, receiving the first user communications from the optical network over the first optical wavelength and transferring the first user communications to a second user system;

in the first POP, transferring the first user communications to the optical network over a second optical wavelength instead of the first optical wavelength responsive to a problem with the transfer of the first user communications over the first optical wavelength;

in the optical network, receiving the first user communications from the first POP over the second optical wavelength and transferring the first user communications to the second POP over the second optical wavelength; and

in the second POP, receiving the first user communications from the optical network over the second optical wavelength instead of the first optical wavelength and transferring the first user communications to the second user system.

18. The method of claim 17 wherein receiving the first user communications from the first user system comprises receiving the first user communications from the first user system over the first optical wavelength.

5 19. The method of claim 17 wherein transferring the first user communications to the second user system comprises transferring the first user communications to the second user system over the first optical wavelength.

20. The method of claim 17 further comprising, in the first POP, detecting the problem  
10 with the transfer of the first user communications over the first optical wavelength.

21. The method of claim 17 further comprising:

in the second POP, detecting the problem with the transfer of the first user communications over the first optical wavelength and transferring a control instruction to  
15 the first POP; and

in the first POP, receiving the control instruction wherein transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises transferring the first user  
20 communications to the optical network over the second optical wavelength responsive to the control instruction.

22. The method of claim 17 further comprising:

in the optical network, detecting the problem with the transfer of the first user communications over the first optical wavelength and transferring a control instruction to the first POP; and

5 in the first POP, receiving the control instruction wherein transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises transferring the first user communications to the optical network over the second optical wavelength responsive to  
10 the control instruction.

23. The method of claim 17 wherein the user detects the problem with the transfer of the first user communications over the first optical wavelength and transfers a control instruction to the first POP, and further comprising, in the first POP, receiving the control  
15 instruction wherein transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises transferring the first user communications to the optical network over the second optical wavelength responsive to the control instruction.

24. The method of claim 17 wherein the user detects the problem with the transfer of the first user communications over the first optical wavelength and transfers a control instruction to the second POP, and further comprising, in the second POP, receiving the control instruction wherein receiving the first user communications from the optical
- 5 network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises receiving the first user communications from the optical network over the second optical wavelength responsive to the control instruction.
- 10 25. The method of claim 17 wherein, in the optical network, transferring the first user communications to the second POP over the first optical wavelength comprises transferring the first user communications over the first optical wavelength in a first physical path, wherein, in the optical network, transferring the first user communications to the second POP over the second optical wavelength comprises transferring the first
- 15 user communications over the second optical wavelength in a second physical path, and wherein the first physical path is geographically diverse from the second physical path.

26. The method of claim 17 further comprising:

in the second POP, receiving second user communications from the second user system and transferring the second user communications to the optical network over a third optical wavelength;

5 in the optical network, receiving the second user communications from the second POP over the third optical wavelength and transferring the second user communications to the first POP over the third optical wavelength;

in the first POP, receiving the second user communications from the optical network over the third optical wavelength and transferring the second user

10 communications to the first user system;

in the second POP, transferring the second user communications to the optical network over a fourth optical wavelength instead of the third optical wavelength responsive to a problem with the transfer of the second user communications over the third optical wavelength;

15 in the optical network, receiving the second user communications from the second POP over the fourth optical wavelength and transferring the second user communications to the first POP over the fourth optical wavelength; and

in the first POP, receiving the second user communications from the optical network over the fourth optical wavelength instead of the third optical wavelength and

20 transferring the second user communications to the first user system.

27. The method of claim 17 wherein, in the first POP, receiving the first user communications from the first user system, transferring the first user communications to the optical network over the first optical wavelength, and transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises, in a wavelength switching system, receiving first user communications from the first user system, transferring the first user communications over the first optical wavelength, and transferring the first user communications over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength.

28. The method of claim 27 further comprising, in the wavelength switching system, detecting the problem with the transfer of the first user communications over the first optical wavelength.

29. The method of claim 27 wherein, in the first POP, receiving the first user communications from the first user system, transferring the first user communications to an optical network over the first optical wavelength, and transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises, in a Wavelength Division Multiplexing (WDM) system, receiving the first user communications from the wavelength switching system over the first optical wavelength and transferring the first user communications over the first optical wavelength or receiving the first user communications from the wavelength switching system over the second optical wavelength and transferring the first user communications over the second optical wavelength.

30. The method of claim 29 further comprising:

in the WDM system, detecting the problem with the transfer of the first user communications over the first optical wavelength and transferring a control instruction to the wavelength switching system; and

in the wavelength switching system, receiving the control instruction wherein transferring the first user communications to the WDM system over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises transferring the first user communications over the second optical wavelength responsive to the control instruction.

31. The method of claim 29 wherein, in the first POP, receiving the first user communications from the first user system, transferring the first user communications to an optical network over the first optical wavelength, and transferring the first user communications to the optical network over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises, in a Synchronous Optical Network (SONET) Add/Drop Multiplexer (ADM) system, receiving the first user communications from the WDM system over the first optical wavelength and transferring the first user communications to the optical network over the first optical wavelength or receiving the first user communications from the WDM system over the second optical wavelength and transferring the first user communications to the optical network over the second optical wavelength.

32. The method of claim 31 further comprising:

15       in the SONET ADM system, detecting the problem with the transfer of the first user communications over the first optical wavelength and transferring a control instruction to the wavelength switching system; and

          in the wavelength switching system, receiving the control instruction wherein transferring the first user communications to the WDM system over the second optical wavelength instead of the first optical wavelength responsive to the problem with the transfer of the first user communications over the first optical wavelength comprises transferring the first user communications over the second optical wavelength responsive to the control instruction.